

REMARKS

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the claims.

Status of the Claims

In the present Reply, claim 1 has been amended and claims 2 and 3 have been canceled without prejudice or disclaimer of the subject matter contained therein. Also, claims 9-15 have been added as being directed to the other embodiments of the present invention for the Examiner's consideration. Thus, claims 1 and 4-15 are pending in the present application.

No new matter has been added by way of the amendment to claim 1, because the amendment is supported by original claim 3. Support for new claims 9-11 can be found in the originally filed claims, as well as in the specification at pages 3-4 (e.g., "epoxy radical" at page 4, line 14). New claim 11 is further supported in the written description at pages 7-9. New claims 12-15 are supported at, e.g., page 4, lines 19-23.

Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

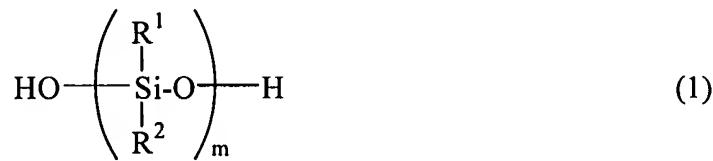
Issues of Double Patenting

Claims 1-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of copending

Application No. 10/676,146 (see paragraph 1 of the Office Action). This rejection is respectfully traversed. Reconsideration and withdrawal thereof are respectfully requested.

The claims of the present invention are patentably distinct from the cited claims of the copending '146 application.

In the present invention, (i) a hydroxyl group terminated diorganopolysiloxane and (ii) an organopolysiloxane copolymer resin are condensed. However, in contrast, the '176 application discloses a silicone adhesive comprising (A) a reaction mixture and (B) a crosslinking agent. In the '176 application, the reaction mixture (A) is obtained by subjecting a partially condensed mixture of (i) a diorganopolysiloxane having a hydroxyl radical at an end of its molecular chain, represented by the general formula (1):



wherein R¹ and R² each are a substituted or unsubstituted monovalent hydrocarbon radical, and m is an integer of 500 to 10,000, and (ii) an organopolysiloxane copolymer having hydroxyl and alkenyl radicals in a molecule and comprising R³₃SiO_{1/2} units and SiO₂ units as main units in a molar ratio of R³₃SiO_{1/2} units to SiO₂ units between 0.5 and 1.5, wherein R³ is a hydroxyl radical or a substituted or unsubstituted monovalent hydrocarbon radical, and (iii) a compound of the general formula (2):



wherein R⁴ and R⁵ each are a substituted or unsubstituted monovalent hydrocarbon radical, and "a" is an integer of 0 to 2, to addition reaction in the presence of a platinum base catalyst.

Thus, the inventive organopolysiloxane partial condensate of the present invention does not contain the compound of the general formula: $HR^4_aSi(OR^5)_{3-a}$, and is thus patentably distinct over the reaction mixture of the cited '176 application.

Furthermore, to enhance the adhesion between the adhesive composition and a substrate, the presently claimed adhesive contains, as an adhesive aid, (B) the silane or siloxane compound having alkenyl or SiH group. Component (B) can form a chemical bond to (ii) the organopolysiloxane copolymer resin and alkoxy group (and epoxy group) which can form a chemical bond to the substrate. Without the above bonded structure of the components (B) and (ii), the component (ii) itself does not have functional groups that contribute to adhesion.

On the other hand, the component (ii) of the '146 application, the organopolysiloxane copolymer resin has alkenyl group, and (iii) an alkoxysilane is reacted therewith to introduce the alkoxysilyl group in a predetermined amount, which leads to an improvement of adhesion of the composition.

Thus, the way of improving the adhesiveness is different between the present invention and the claims of the '146 application. This is in addition to the different ingredient used in the '146 application (e.g., $HR^4_aSi(OR^5)_{3-a}$) versus the present invention. Withdrawal of this rejection is requested.

Issues Under 35 U.S.C. § 103(a)

Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoki (U.S. 2002/0013386 A1; hereinafter referred to as "Aoki '386") in view of Fujita et al. (U.S. 2002/0086942 A1; hereinafter "Fujita '942") (this is a new ground of rejection; see

paragraphs 2-6 of the Office Action). This rejection is respectfully traversed. Reconsideration and withdrawal thereof are respectfully requested.

First, the rejection of claim 2 is rendered moot due to its cancellation.

Second, Applicants respectfully refer the Examiner to claim 1 as presented herein. In this regard, claim 1 now incorporates the subject matter of claim 3. Thus, claim 1 is instantly allowable and Applicants respectfully request a declaration to that effect. Further, the other disputed claims 4 and 5 depend on claim 1, and are also now in allowable form. Thus, reconsideration and withdrawal of this rejection are respectfully requested.

New Claims 9-15

Applicants have added new claims 9-15 directed to other embodiments of the present invention for the Examiner's consideration. Applicants add the following remarks regarding these new claims.

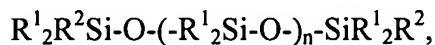
The present invention provides a silicone adhesive exhibiting pressure-sensitive adhesion and permanent adhesion, comprising (A) a crosslinkable organopolysiloxane partial condensate composed of a chain-like organopolysiloxane and a solid silicone resin, (B) a specific silane or siloxane compound, and (C) a crosslinking agent (an organic peroxide).

The inventive adhesive can be sheeted into an adhesive film and this silicone adhesive can develop initially pressure sensitive adhesion (or tackiness) and subsequently form a strong bond to a substrate through brief heat compression. Having such adhesive properties, the present invention can be applied as the dicing/die bonding layer as experimentally shown in the Examples of Applicants' specification.

Aoki '386 discloses a silicone-based pressure-sensitive adhesive composition which comprises, as a uniform blend the following ingredients:

(A) 100 parts by weight of a silicone ingredient which is a combination, either as a mixture or as a condensation product, of

(a) a diorganopolysiloxane represented by the general formula



wherein R^1 is a monovalent hydrocarbon group having 1 to 10 carbon atoms, R^2 is a hydroxyl group or R^1 and the subscript n is an average number not smaller than 500, and

(b) an organopolysiloxane consisting of monofunctional siloxane units of the formula $R^1_3SiO_{0.5}$, in which R^1 has the same meaning as defined above, and tetrafunctional siloxane units of the formula SiO_2 in a molar ratio of the monofunctional siloxane units to the tetrafunctional siloxane units in the range from 0.6 to 1.3,

the weight proportion of the diorganopolysiloxane (a) to the organopolysiloxane (b) being in the range from 80:20 to 20:80; and

(B) from 0.5 to 5.0 parts by weight of a 4,4'-dialkyl dibenzoyl peroxide represented by the general formula



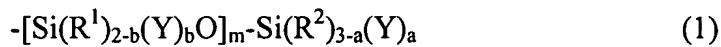
wherein each R is, independently from the other, an alkyl group having 1 to 12 carbon atoms and Pn is a 1,4-phenylene group, as a curing agent of the component (A).

However, as Applicants previously asserted, Aoki '386 fails to disclose or suggest the use of the specific silane or siloxane compound (B) of the present invention (in the newly presented claims). Regarding the missing description of the claimed component (B), the Aoki '386

composition actually corresponds to Comparative Examples 1 and 2 in the present specification. These Comparative Examples demonstrate inferior adhesiveness when compared to the present invention. The comparative composition exhibits, at the initial, a tackiness sufficient to fixedly secure a substrate for allowing a desired step (cutting or the like) to be performed on the substrate. However, by press bonding another substrate to the adhesive-bearing substrate and heating them, the comparative substrates cannot be bonded together at all without the specific silane or siloxane compound (B). Therefore, new claims 9-15 are allowable over Aoki '386.

Furthermore, Aoki '386 discloses a pressure sensitive adhesive tape having a polyethylene terephthalate substrate and a coating of the cured composition thereon. However, Aoki '386 fails to disclose or suggest a composition which can be formed into a release sheet peeled from the film form and press bonded to the substrate with permanent adhesion. More particularly, Aoki '386 fails to disclose the silicone composition which can form a film adhesive by itself. This is another patentable distinction of the present invention.

The other cited reference of Fujita '942 discloses an adhesive curable composition which comprises, as a main component, a vinyl polymer having at least one crosslinkable silyl group represented by the general formula (1):



wherein each R¹ and R², which may be the same or different, represents an alkyl group of C₁₋₂₀, an aryl group of C₆₋₂₀, an aralkyl group of C₇₋₂₀, or a triorganosiloxy group of the formula (R')₃SiO- (in which R' represents a monovalent hydrocarbon group of C₁₋₂₀, and the plural R' groups may be the same or different) and, Y, which may be the same or different, represents a hydroxyl group or a hydrolyzable group and; a represents 0, 1, 2 or 3; b represents 0, 1 or 2; and

m represents an integer of 0 to 19; with the condition that a, b and m satisfy the relation $a+mb \geq 1$.

The Examiner states in the Office Action that Fujita '942 discloses a pressure sensitive adhesive composition containing silicon-bonded hydroxyl groups in paragraphs [0016] and [0017]. However, an organic polymer such as (meth)acrylic polymer constitutes a main chain of a base polymer of the composition as disclosed in paragraphs [0024]-[0026], and the alkoxy silyl group of formula (1) is introduced thereto as a side chain through a chemical bond for crosslinking to improve cohesion. This (meth)acrylic polymer used as the base polymer in Fujita '942 is quite different from the organopolysiloxane partial condensate of component (i) and (ii) of the invention or even the organopolysiloxane of Aoki '386.

Furthermore, Fujita '942 discloses in paragraph [0145] that the composition is prepared as a one-component formulation, and when applied, it absorbs moisture in the air and is thereby cured. Also, when the composition of Fujita '942 is used as a pressure sensitive adhesive composition, it is exposed to moisture or water and allowed to stand for curing at room temperature or heated for curing (see paragraph [0150]). Thus, as Applicants have previously asserted, the moisture curable composition as disclosed in Fujita '942 takes a much longer time to exhibit desired adhesiveness.

On the other hand, the silicone adhesive of the invention exhibits at the initial a tackiness (or pressure-sensitive adhesion) sufficient to fixedly secure the substrate for allowing a desired step (cutting or the like) to be performed on the substrate. In addition, by press bonding another

substrate to the adhesive-bearing substrate and heating them, the substrates can be firmly bonded together. Fujita '942 fails to disclose or suggest this feature of the present invention.

The Examiner also states that Fujita '942 teaches the addition of silane coupling agents specifically mentioning vinyl alkoxy silanes in paragraphs [0132]-[0133]. However, Fujita '942 merely suggests that the hardness of the cured product is improved and the elongation is increased ([0132]). Fujita '942 further fails to disclose that incorporation of the alkoxysilyl group-bearing compound into the organic polymer having no alkoxysilyl groups in the main chain can enhance the adhesiveness. This is probably why there exists no explanation of a suitable alkoxysilyl group-bearing compound to be added to the organic polymer free of alkoxysilyl groups in the main chain to improve the adhesion as well as effective combination of such compound and the catalyst, especially in the Fujita '942 reference.

In contrast, the inventive adhesive contains, as the adhesive aide, (B) the silane or siloxane compound having alkenyl or SiH group which can form the chemical bond to (ii) the organopolysiloxane copolymer resin and alkoxy group (and epoxy group) which can form the chemical bond to the substrate, so that the cured composition exhibits permanent adhesion.

Fujita '942 fails to disclose the use of the specific silane or siloxane compound chemically bonded to the organopolysiloxane resin, (*see especially the compounds as instantly defined in claim 11*), and the feature thereof.

Further, each component is simply mixed together to produce the composition without the cumbersome step of introducing the alkoxysilyl group into the polymer through the chemical bond as disclosed in Fujita '942.

Moreover, Fujita '942 prefers to suppress viscosity increase of the composition as disclosed in paragraph [0222]: "The crosslinkable silyl-containing vinyl polymers of the present invention have a narrow molecular weight distribution, hence have a very low viscosity as compared with the polymers of the comparative synthesis examples which are roughly comparable in molecular weight, and are superior in handling properties . . .".

Unlike the composition of Fujita'942, the present invention prefers film that can be shaped under higher viscosity. Even on this point, the inventive composition is quite different from the composition of Fujita '942.

As discussed above, the base polymer of Aoki '386 (and the invention) and Fujita '942 are quite different and thus, these compositions are different from one other. Therefore, a person having ordinary skill in the art is not motivated and/or reasonably expect to be successful in combining the disclosure in the two cited references to achieve what is claimed as recited in claims 9-15. Even if they are combined, *arguendo*, the use of the specific silane or siloxane compound chemically bonded to the organopolysiloxane resin and the unexpected advantages thereof are not expected from the disclosure in the two cited references.

Accordingly, the inventive adhesive containing the specific components (A) to (C) and the features thereof are patentably distinct over Aoki '386 and Fujita '942, or any other reference or combinations thereof. Thus, early and favorable action on newly added claims 9-15 is respectfully requested.

Conclusion

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact Eugene T. Perez (Reg. No. 48,501) at the offices of Birch, Stewart, Kolasch & Birch, LLP.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: January 12, 2006

Respectfully submitted,

By

Andrew D. Meikle
Registration No.: 32,868
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road
Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicant